Everglades Protection Area Tributary Basins

Long-Term Plan for Achieving Water Quality Goals

Quarterly Long-Term Plan Communications Meeting

November 30, 2005

LTP General Update

General Update on Long-Term Plan Implementation

Tracey Piccone

LTP General Update

- NSID Basin
  - Evaluation of Alternatives for Elimination of Stormwater Discharge from NSID to the EPA
    - Contract with A.D.A. Engineering, Inc.
  - Final Task 3 Tech Memo Final Alternative Schematic Design posted at: http://www.sfwmd.gov/org/erd/longtermplan/documents.shtml
  - Task 4 Cost Estimates for Alternatives posted at: http://www.sfwmd.gov/org/erd/longtermplan/documents.shtml

LTP General Update

- C-11 W Basin
  - Analysis of Enhancements to Western C-11 Impoundment
    - Contract with Burns & McDonnell
    - Kick-off meeting was held on June 8, 2005
    - Completion of study currently scheduled for approx. March 2006

LTP General Update

- NNRC Basin
  - Flood Impact Analysis for the North New River Canal Basin
    - Contract with Earth Tech, Inc.
  - Task 2: Hydraulic Analysis
    - Found not using G-123 would impact flood protection in NNRC basin
    - Recommends further studies to optimize flood protection in the basin
    - Posted at: http://www.sfwmd.gov/org/erd/longtermplan/documents.shtml
  - Task 3: Evaluate alternatives to offset impact of not using G-123 for flood protection
    - Posted at: http://www.sfwmd.gov/org/erd/longtermplan/documents.shtml

LTP General Update

- Update & Maintenance of Hydraulic Models
  - 2d models complete: STA-1W, STA-2, STA-6, STA-5, STA-3/4
    - Reports Posted at: http://www.sfwmd.gov/org/erd/longtermplan/documents.shtml
  - STA-1E model and report under development
    - Scheduled to be completed by Dec. 30, 2005

LTP General Update

- 2006 South Florida Environmental Report - SFER
  - Summary of FY 2005 Long-Term Plan project activities
    - Chapter 8 and other chapters
  - Summary of WY 2005 STA performance
    - Chapter 4
  - Draft Available at
    - http://www.sfwmd.gov/sfer/
  - Peer Review & Public Workshop was held:
    - September 27, 28, 29, 2005 at District HQ, B-1 Auditorium
  - Final Report available early 2006

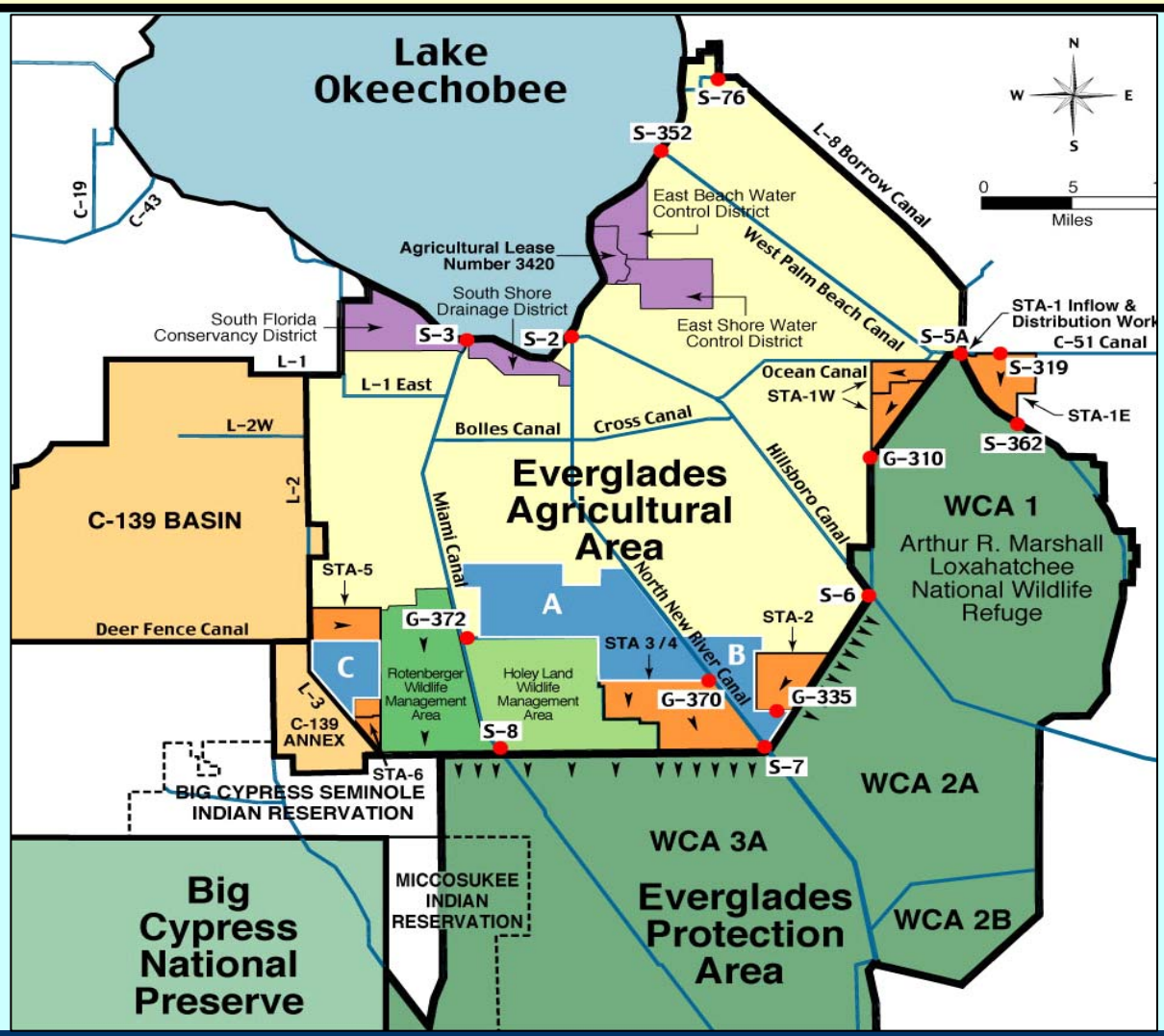
LTP Update

Long-Term Plan Projects in Acceler8

LTP Projects in Acceler8

- EAA STAs on Compartments B and C
  - STA-2 Cell 4
  - Build-out of STAs on remainder of Compartment B
  - STA-5 Flow-way 3
  - STA-6 Enhancements and STA-6 Section 2
  - Build-out of STAs on remainder of Compartment C
- EAA Regional Feasibility Study

Everglades Agricultural Area Map

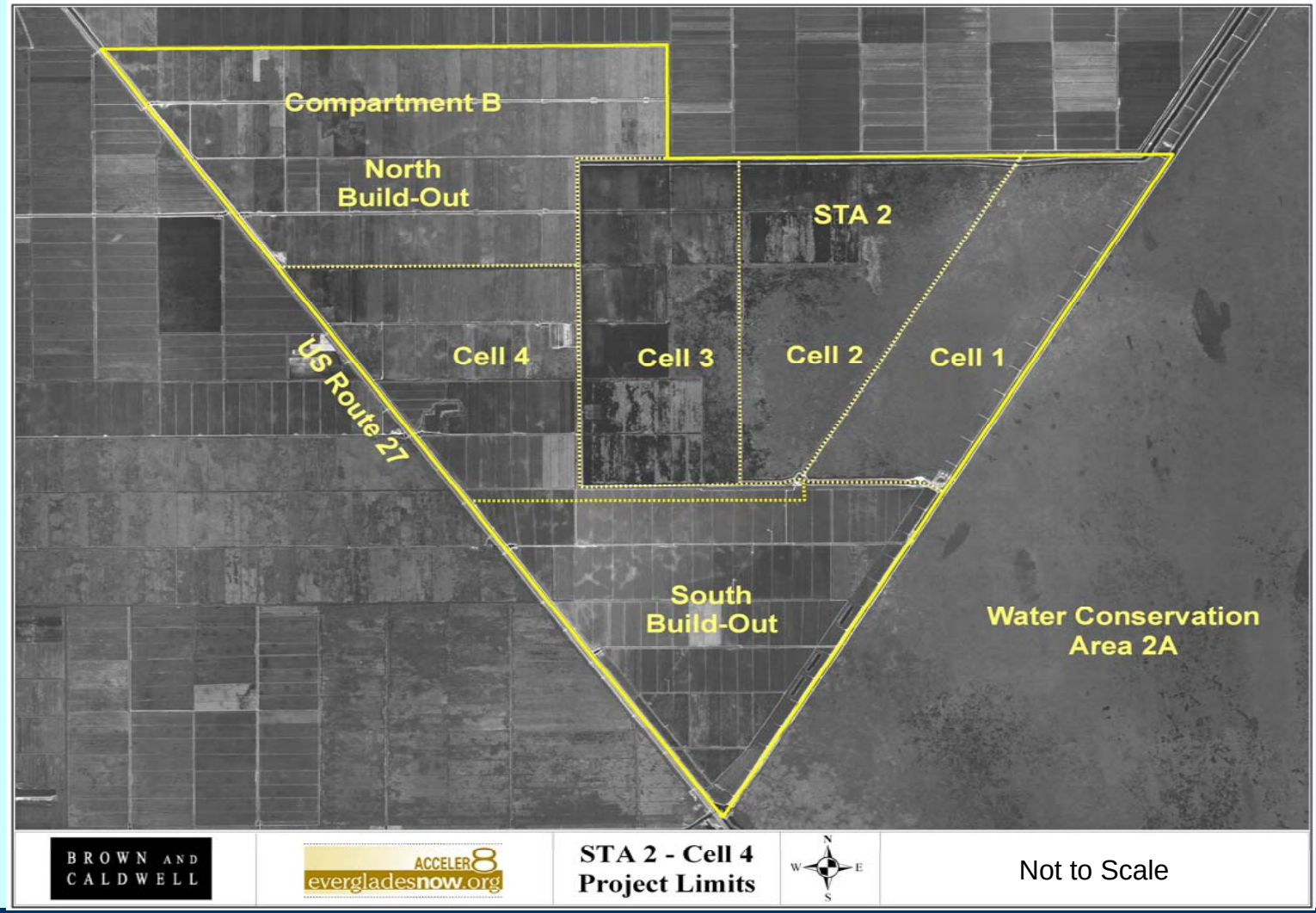


Everglades Protection Area Tributary Basins
Long-Term Plan for Achieving Water Quality Goals

STA-2 Cell 4

- Improve water quality discharging from STA-2
- Increase operational flexibility
- Flow capable by December 31, 2006
- Submerged Aquatic Vegetation (SAV) dominated treatment cell
- 2,015-acre expansion in Compartment B

STA-2 Cell 4 Site Plan



Everglades Protection Area Tributary Basins
Long-Term Plan for Achieving Water Quality Goals

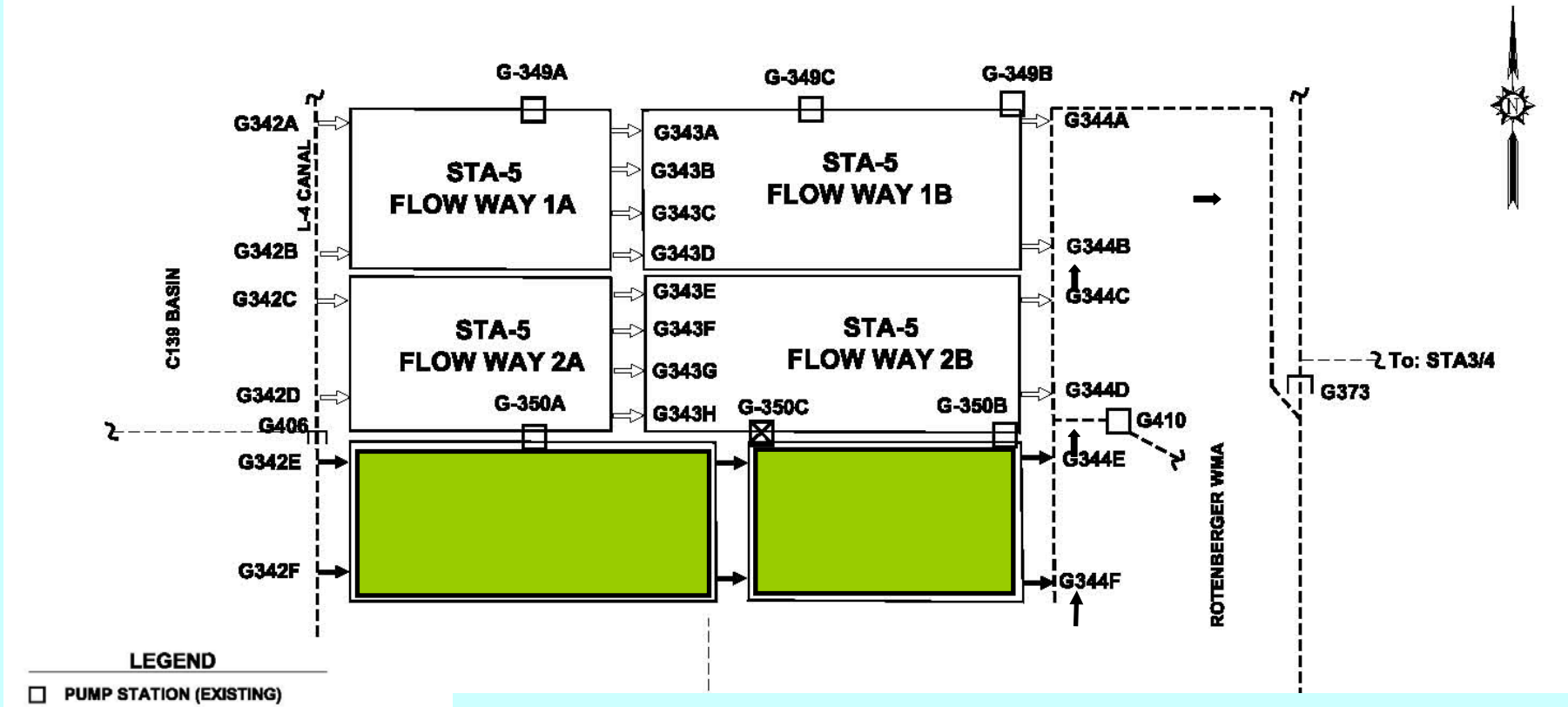
STA-2 Cell 4

- Implementation Timeline
  - Preliminary Site Survey & Mapping — Complete
  - Geotechnical Investigation — Complete
  - Basis of Design Report — Complete
  - Preliminary Engineering — Complete
  - Final Plans & Specifications — Complete
  - Start Demolition & Site Preparation — Ongoing
  - Main Cell 4 Construction Start — Jan 2006
  - Cell 4 Flow Capable — Dec 2006

STA-5 Flow-way 3

- Improve water quality discharging from STA-5
- Increase operational flexibility
- Flow capable by December 31, 2006
- Emergent vegetation upstream cell followed by SAV downstream cell
- 2,560-acre expansion in Compartment C

STA-5 Flow-way 3 Site Plan



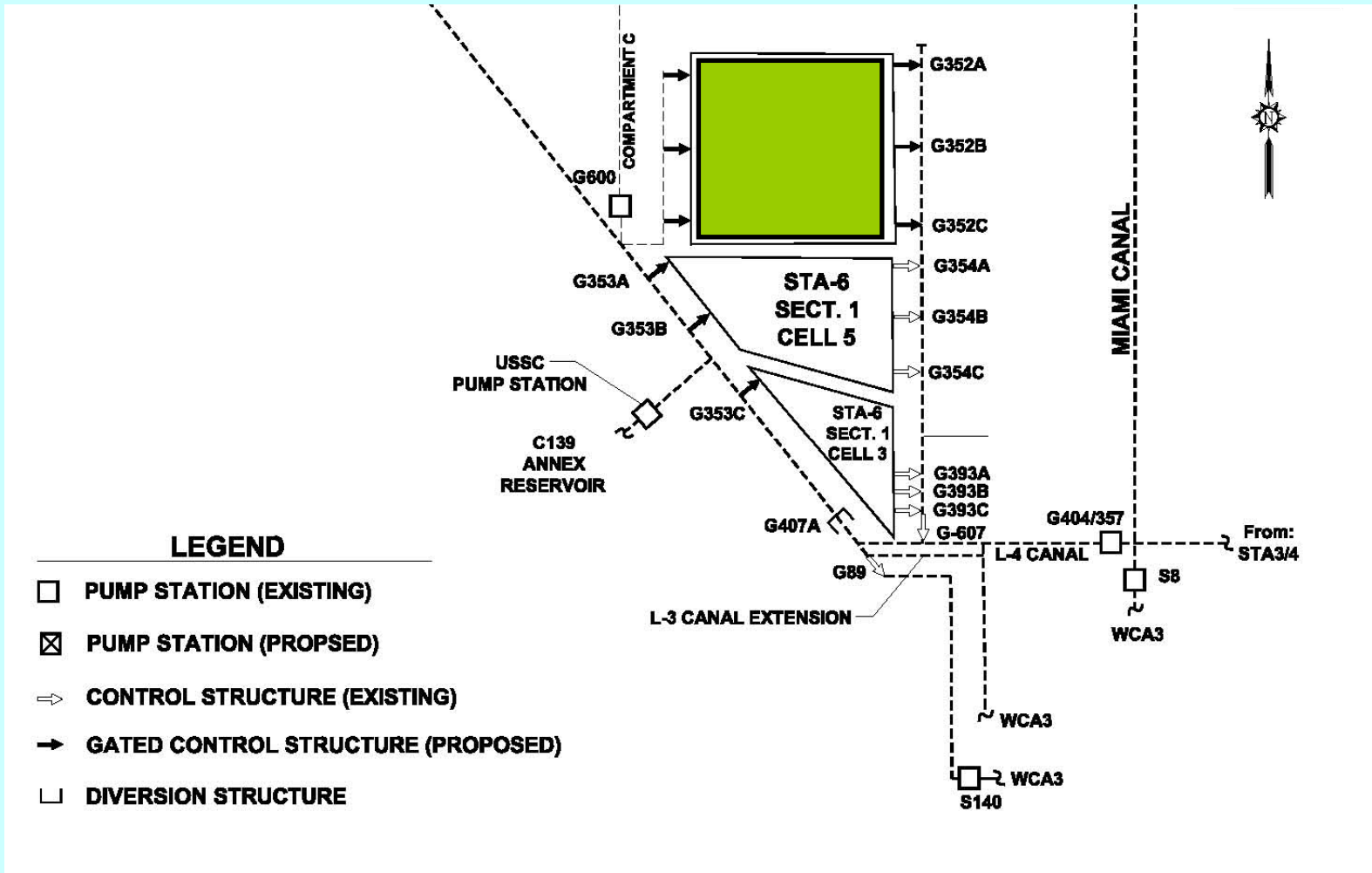
STA-5 Flow-way 3

- Implementation Timeline
  - Preliminary Surveying/Geotechnical — Complete
  - H&H Modeling — Complete
  - Basis of Design Report — Complete
  - Final Plans & Specifications — Complete
  - Bid Award — Jan 2006
  - Flow-way 3 Flow Capable — Dec 2006

STA-6 Enhancements and STA-6 Section 2

- Improve water quality discharges to Everglades Protection Area
- Expand STA-6 with a new 1,440-acre Section 2
- Flow capable by December 31, 2006

STA-6 Section 2 Site Plan

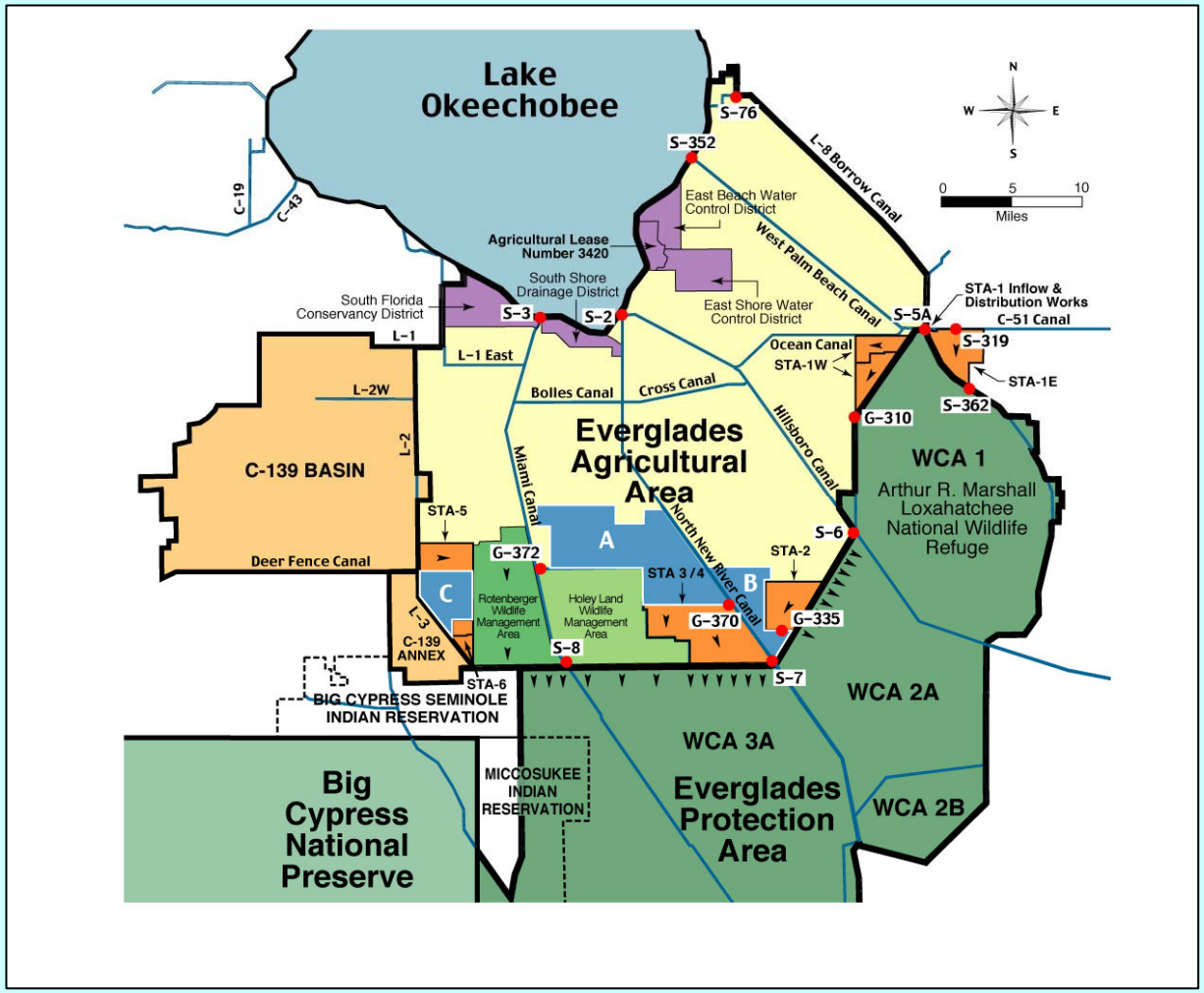


Everglades Protection Area Tributary Basins
Long-Term Plan for Achieving Water Quality Goals

STA-6 Section 2

- Implementation Timeline
  - Preliminary Site Surveying & Mapping — Complete
  - Geotechnical Investigation — Complete
  - Basis of Design Report — Complete
  - Final Plans & Specifications — Complete
  - Construction Start — Jan 2006
  - Flow Capable — Dec 2006

EAA Regional Feasibility Study



Everglades Protection Area Tributary Basins
Long-Term Plan for Achieving Water Quality Goals

Purpose

- Optimize distribution of flows and loads to STAs to improve water quality in the EPA incrementally for:
  - **existing system**
  - **And with future Acceler8 projects**
- Develop information necessary for planning, design and construction of future projects

Coordination Efforts

- Long-Term Plan Technical Working Group
- Long-Term Plan Quarterly Communications Meetings
- US Department of Interior
- USACE
- Audubon
- FDEP
- EAA Environmental Protection District
- Refuge staff
- Stakeholders
- Consultants
- SFWMD staff

Evaluation Criteria

- **Technical Factors**
  - Long-term TP Concentration Achieved
  - Flood Impact Analysis
  - Operational Flexibility
  - Reservoir Operation
  - Implementation Schedule (including Real Estate Acquisition)

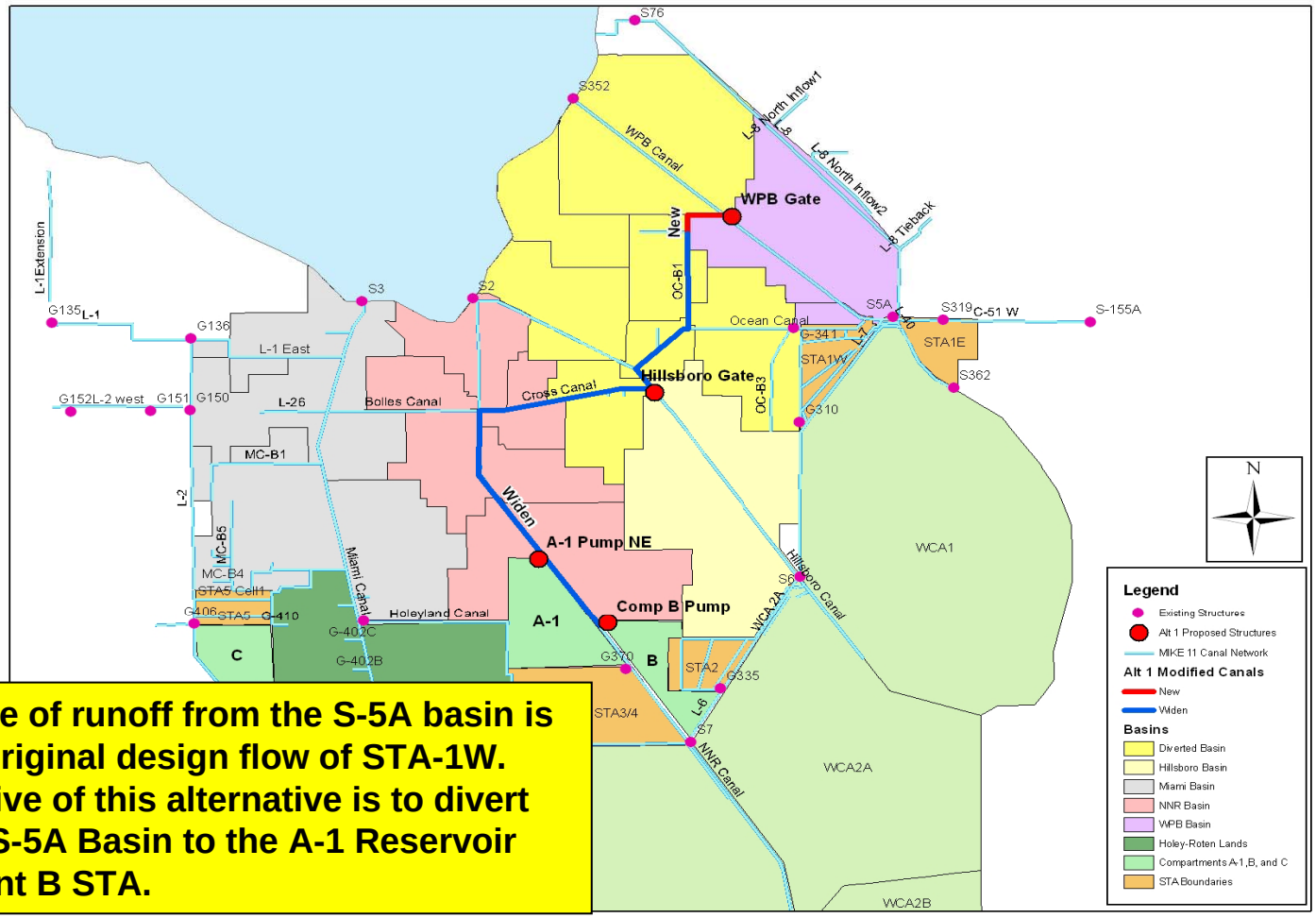
Evaluation Criteria

- **Environmental Factors**
  - Re-distribution of flows and TP loads to the receiving waters
  - Maintain desirable levels in the Refuge

Evaluation Criteria

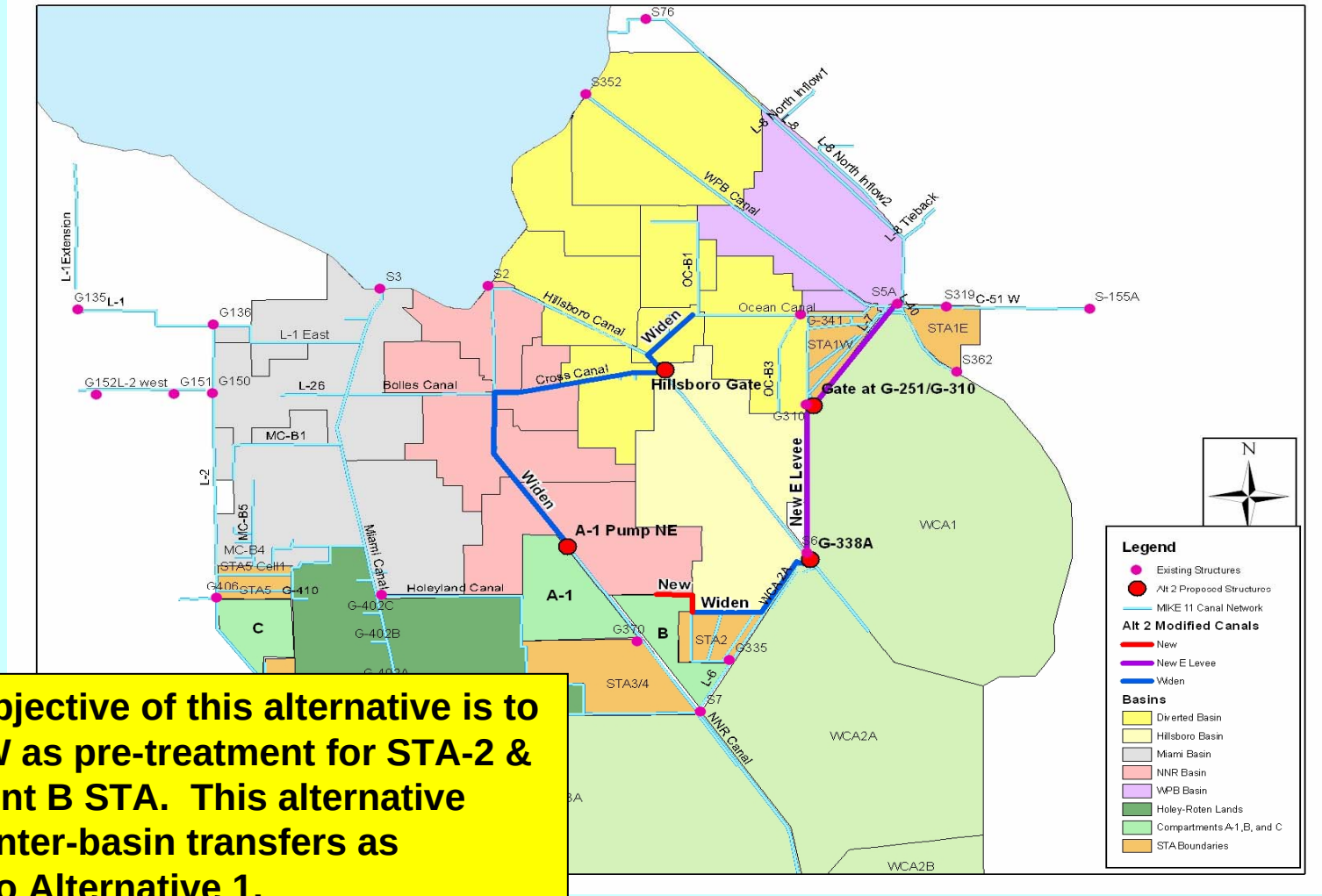
- **Economic Considerations**
  - Capital and O&M Cost Estimates
    - Total 50-yr Present Worth
  - Cash Flow Analysis

Alternative 1



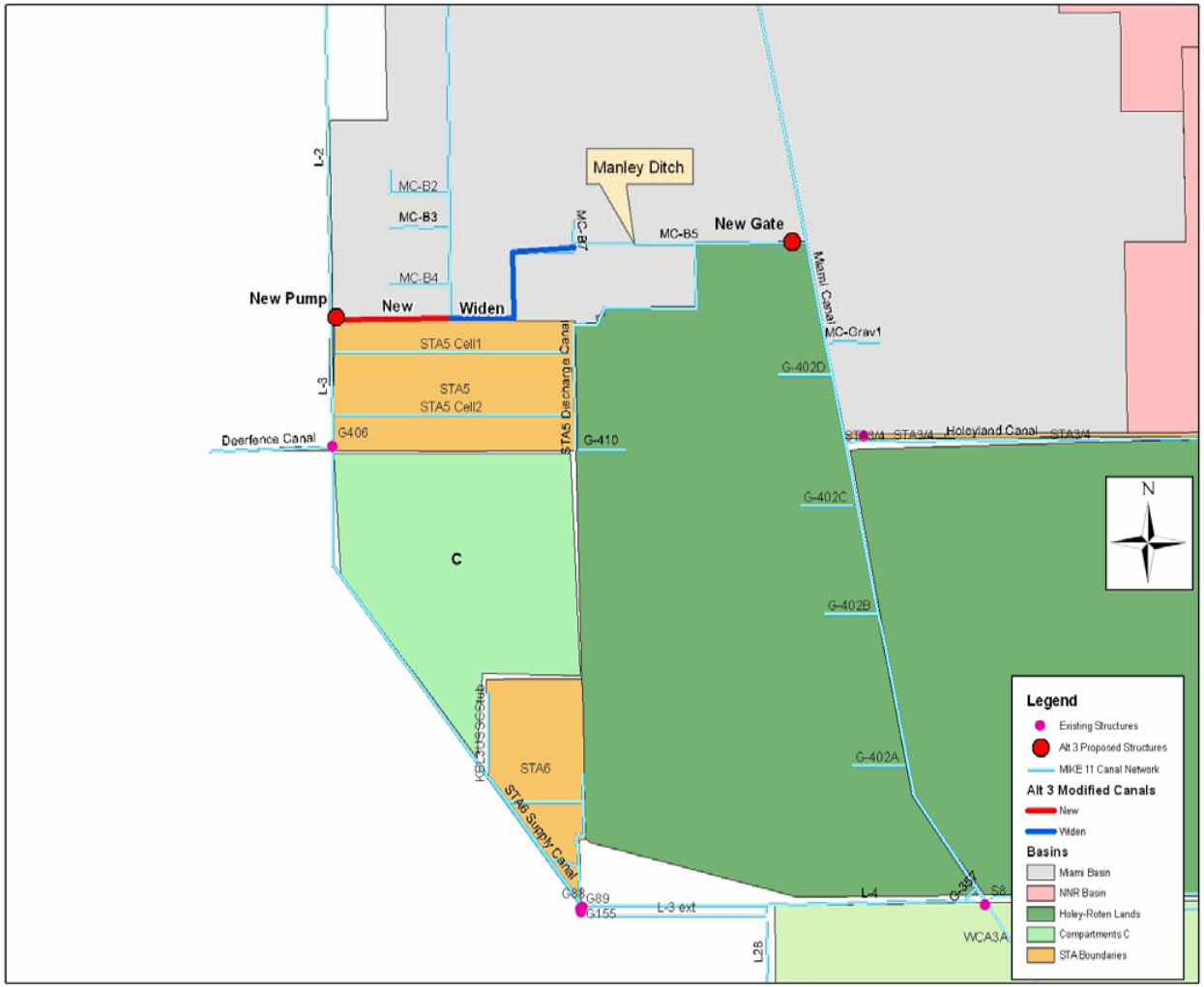
Updated estimate of runoff from the S-5A basin is larger than the original design flow of STA-1W. The main objective of this alternative is to divert runoff from the S-5A Basin to the A-1 Reservoir and Compartment B STA.

Alternative 2



The main objective of this alternative is to use STA-1W as pre-treatment for STA-2 & Compartment B STA. This alternative minimizes inter-basin transfers as compared to Alternative 1.

Alternative 3



- Diverts Miami Canal (EAA) runoff to STA-5, STA-6 & Compartment C STA

Alternative 4

Objective was to use the best features of Alternatives 1, 2, and 3, and to reduce the overall cost without sacrificing performance.

- Enlarge L-7, separate of Canal from LNWR
- Divert S-2/S-6 to Cross Canal and North New River Canal
- Connect Manley Ditch to STA-5 Seepage Canal
- Enlarge Cross and Bolles Canals
- Widening of the North New River Canal

Abandoned as it did not perform better than Alt 1 or Alt 2, and it was more expensive.

Alternative 5

This is a variant of Alternative 1 that has Compartment B STA separate from Cell 4 of STA-2

- **Compartment B additions:**
  - 1,600 cfs inflow pump station
  - Inflow canals
  - Inverted siphons under STA-2 Cell 4
  - 1,600 cfs outflow pump station

Note: An inverted siphon needs high velocities to be self-flushing. High velocity = high head losses. Maintenance is concern for siphons.

Summary of Alternative Analysis

Evaluation Criterion	Quantitative Measure (See Note 1)			
	Alternative 1	Alternative 2	Alternative 3	Alternative 5
Technical Factors				
1. Long-Term Phosphorus Concentration Achieved (Flow-weighted mean value)	17.1 ppb (13.3 – 18.9)	16.4 (14.9 – 18.3)	Alt1 or better depending on STA 5 performance	17.1 ppb (13.3 – 18.9)
2. Flood Impact Analysis				
• Flooding (>12.5 ft NGVD)	0.0 miles	4.8 miles	0.0 miles	4.8 miles
• Canal Peak Stage, Miami 3914	12.4 ft-NGVD	12.93 ft-NGVD	11.75 ft-NGVD	12.6 ft-NGVD
3. Operational Flexibility				
• Structures/Pump Stations	Two new gates, Two new pump stations	Two new gates, One new pump station	3 new gates, 3 new pump stations	Two new gates, Two new pump stations
• Operational Modifications	Two new flow routes	STA 1W to STA 2 via L-7	3 new flow routes	Two new flow routes
	2,760 cfs Cross to NNR	3,093 cfs Cross to NNR	2,760 cfs Cross to NNR	2,500 cfs Cross to NNR
• Operational Concerns		5,000 cfs A-1 PS required	Implement if STA 5 TP removal improves	Maintenance of siphons is difficult
4. Reservoir Operation Factors				
• Reservoir Avg Annual Inflow Vol.	416,800 ac-ft/yr	416,800 ac-ft/yr	416,800 ac-ft/yr	416,800 ac-ft/yr
• Reservoir Design Inflow Volume	130,800 ac-ft	168,200 ac-ft	130,800 ac-ft	130,800 ac-ft
• Irrigation Supply, Ac-ft/yr	180,000 ac-ft/yr	180,000 ac-ft/yr	180,000 ac-ft/yr	180,000 ac-ft/yr
5. Implementation Schedule including Real Estate (completion year)	2010	2010	2010	2010
Environmental Factors				
6. Redistribution of flows and loads	1,715,679 ac-ft/yr	1,540,500 ac-ft/yr	1,715,679 ac-ft/yr	1,715,679 ac-ft/yr
7. Impact to Refuge	See note 2.	See note 2.	See note 2.	See note 2.
Economic Considerations				
8. Opinion of Probable Planning Level Capital, Real Estate, & O&M Cost (50 yrs present worth)	$459 million	$495 million	$480 million	$464 million
9. Cash Flow Analysis (See note 3)	21 million / 3.25 yrs	26 million / 2.5 yrs	21 million / 3.25 yrs	24 million / 2 yrs

Notes:
1. Alternative 4 is not shown due to initial modeling results.
2. Further study required.
3. Duration given is the period of primary construction activity.

Alternative Capital Costs*

1	2	3	5
$152.05M	$180.71M	$167.19M	$153.77M

*Costs excluding Compartment B&C STAs, and Annual O&M

Results

- No large differences in predicted STA outflow TP concentrations
- Alt 1 is more robust than Alt 2 for maintaining flood control
- Alt 2 requires a larger pump station for the A-1 Reservoir
- No large differences in costs

Operational Flexibility

- Alt 1 performs well in conveying WPB runoff to NNRC while maintaining flood control
- Alt 2 requires more pump station capacity to achieve inter-basin transfers
- Alt 2 allows for separation of treated EAA runoff from the Refuge
- Alt 3 has Alt 1 benefits and also reduces discharges to Miami Canal

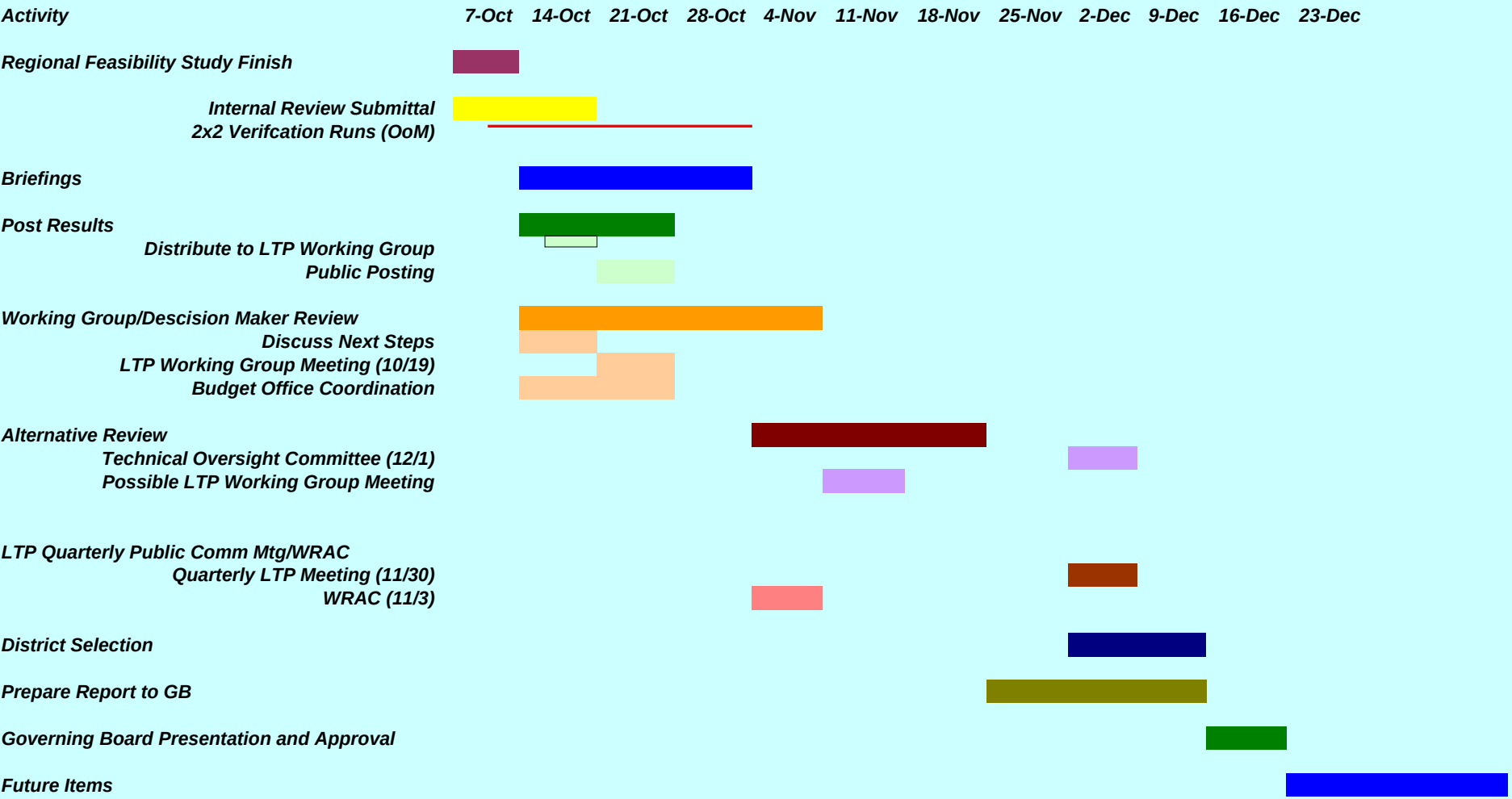
Re-distribution of flows and TP loads to the receiving waters

- Flows to LNWR will decrease for all alternatives
- Alt 2 has the greatest reduction, but will probably reduce net seepage from LNWR
- Hydraulic impact to LNWR is currently being evaluated further by SFWMD using the 2x2 model

Implementation Schedule

ALTERNATIVE	PROJECTED COMPLETION DATE
Alternative 1	2010
Alternative 2	2010
Alternative 3	2010
Alternative 5	2010

Schedule Moving Forward*



*Note: Some dates shown above have been impacted by Hurricane Wilma.